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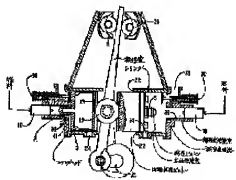
(54) DEVICE AND METHOD FOR MAKING PENDULUM PISTON TO SERVE AS ENERGY PRESERVING CYCLE

(57)Abstract:

PROBLEM TO BE SOLVED: To increase a compression ratio and realize improvement of output in a device in which a crankshaft is rotated through a pendulum arm by the reciprocating motion of a double-end diameter enlarged piston, by arranging cams for retaining the intermediate part and one end of the pendulum arm on the double-end enlarged piston side and a main body side.

SOLUTION: Two double-end diameter enlarged pistons are fitted to a pair of cylinders oppositely arranged, and the head parts of these double-end diameter enlarged pistons are formed into an appropriate recessed part, thereby a diameter enlarged combustion chamber is partitioned. Diameter contracted pistons are projected from the approximately centers of the appropriate recessed parts of these diameter enlarged pistons, so that a diameter contracted main combustion chamber can be partitioned, and combustion gas can be injected at a super high speed from the diameter contracted main combustion chamber when the isolation of the diameter enlarged pistons is released. Annular uneven parts 5... which are perpendicular to a piston moving direction are arranged in the peripheral surface of the diameter contracted piston, and also a noise reducing groove 11 slantly extended is arranged in the projected part at an end. Then, a pendulum arm is engaged with and retained in a pendulum hole 6 arranged in an approximately center between the



* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention]In order to raise the energy conversion efficiency which changes reciprocating movement of a piston into rotational motion power in this invention, adopt a pendulum motion crank chain, and. Aim at reduction of fuel using the principle of mechanical energy preservation as isolation combustion in a diameter reduction main combustion chamber which continued at the prescribed period after a dead center for example, whose diameter was reduced in 1 grade for 5 minutes, using energy consumption (capacity like a piston line) near the dead center as small, and. A great portion of heat energy large-increases by preservation savings (carrying out a pressure buildup), and is brought close to the highest firing pressure at the time of isolation release (they are 30 degrees thru/or 70 degrees at a dead center rear-brake-bell-crank angle).
Therefore, it is related with the device and method of making it into the energy preservation cycle which aims at large reduction of a public nuisance as approximation constant volume combustion at the same time it large-increases the rotational motion power before and behind the capital machine first half of the energy conversion efficiency around after [a dead center] 60 degrees (the degree of crank angle is omitted henceforth) (refer to drawing 1 B).

[Translation done.]

PRIOR ART

[Description of the Prior Art]The outline of Japanese Patent Application No. 7-79292 (the 1st application), Isolation water-by-combustion injection in a diameter reduction main combustion chamber is mainly carried out among the means which make the usual both-way piston cycle an energy preservation cycle, and heat insulation non-cooler Seki is substantially provided for a diameter expansion combustion chamber as a combustion chamber of low temperature low pressure by energy conversion (it is large conversion to low-temperature superheated steam). The outline of Japanese Patent Application No. 8-27207 (the 2nd application) makes the reverse pendulum piston cycle of an invention specially the energy preservation cycle of various sorts. The outline of Japanese Patent Application No. 8-78414 (the 3rd application of a claim of priority) explains the principal part for making the usual both-way piston cycle into an energy preservation cycle. The outline of Japanese Patent Application No. 8-122114 (the 4th application of a claim of priority) provides the method and device which make the usual both-way piston cycle an energy preservation cycle. The outline of Japanese Patent Application No. 8-172752 (the 5th application of a claim of priority) provides the method and device which make the pendulum piston of an invention an energy preservation cycle specially. Therefore, all by isolation combustion in a diameter reduction main combustion chamber whose diameter was reduced suitably to the worst machine of the rotational motion power conversion efficiency near after [a dead center thru/or a dead center] 30 degree. Large increase (it acts as Noboru Oue of the pressure with a little fuel) of the heat energy is carried out by preservation savings, it acts as Noboru Oue of the thermal efficiency as giant roll power near in the capital machine first half of rotational motion power conversion efficiency, and large reduction of a public nuisance is aimed at by combustion at the time of approximation constant volume combustion and isolation release.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]If it is an energy preservation cycle like ****, in addition to the thing in which large reduction of a public nuisance is possible, since [infinite] many composition is possible, provide many composition, acting as Noboru Oue of the thermal efficiency, but. especially — a pendulum piston crank chain — structure — it is easy, and since it is made to small lightweight high power, an invention is continued. namely, — there is a portion whose power conversion efficiency is very bad in a both-way piston crank chain near after [a dead center thru/or a dead center] 30 degree — the heat energy (heat energy more than a compression pressure) of the maximum [conventional technology] in this portion — abbreviated, in order to consume all, In order that a great portion of heat energy may be used for increase of friction loss, etc., heat energy may almost be lost to the capital machine of power conversion efficiency, thermal efficiency may large-decrease and volume of combustion chamber may grow rapidly from the early stages of combustion, In order to become the non-constant volume combustion of the degree of pole of low-pressure low temperature and to carry out sudden shift at the worst burning-conditions combustion, if unburned-combustibles reduction combustion is used, it will become NOx increase combustion, if NOx reduction combustion is used, it will become unburned-combustibles increase combustion, and an exhaust gas public nuisance large-increases, and usual SUBJECT that thermal efficiency large-decreases and collides with a technical wall occurs.

EFFECT OF THE INVENTION

[Effect of the Invention]In this invention, as explained above, do many effects so, but. especially -- conventional technology -- after the dead center when power conversion efficiency is the worst thru/or a dead center -- by 30 degrees -- the maximum heat energy (heat energy more than a compression pressure) -- abbreviated, in order to consume all (drawing 1 D) (a used part decreases), the thing whose efficiency changed into rotational motion power is very bad -- in addition, although thermal efficiency was large-decreasing according to large increase of friction loss, the amount of the heat energy used up to 30 degrees is large-reduced, for example in 1 grade for 25 minutes after a dead center thru/or a dead center by considering it as an energy preservation cycle.
By therefore, the thing which large increase (he is Noboru Oue about a firing pressure) of the heat energy is carried out by preservation savings, large-reducing mechanical loss and fuel combustion mass, and is done for the isolation combustion release in a diameter reduction main combustion chamber making the heat energy of 24 grades for 25 minutes reveal suitably. There is an effect which generates the large effect of the more than which large-increased the compression ratio by conventional technology by an energy preservation cycle and to which it acts as Noboru Oue of the thermal efficiency with giant roll power, and in conventional technology. In order to consume all the abbreviation for the maximum heat energy by 30 degrees after a dead center thru/or a dead center, reduction of the public nuisance was dramatically difficult because of the non-constant volume combustion of the degree of pole in which volume of combustion chamber grows rapidly, sudden shift is carried out at the worst burning conditions of low-pressure low temperature, and combustion gets worse quickly, but. Enable large increase of residual gas by two-step combustion of combustion at the time of the approximation constant volume combustion of the by-product of an energy preservation cycle, and isolation release, and heat insulation non-cooler Seki is made possible by the proper addition of a /energy conversion means or a heat exchange means, There is a big effect of acting as Noboru Oue of the thermal efficiency regardless of the kind, the ignition system, the number of cycles, and scavenging-air method of fuel, and bringing NOx and unburned combustibles close simultaneously there being nothing by isolation combustion in a diameter reduction main combustion chamber of all sizes.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]In order to raise the energy conversion efficiency which changes reciprocating movement of a piston into rotational motion power in this invention, adopt a pendulum motion crank chain, and. Aim at reduction of fuel using the principle of mechanical energy preservation as isolation combustion in a diameter reduction main combustion chamber which continued at the prescribed period after a dead center for example, whose diameter was reduced in 1 grade for 5 minutes, using energy consumption (capacity like a piston line) near the dead center as small, and. A great portion of heat energy large-increases by preservation savings (carrying out a pressure buildup), and is brought close to the highest firing pressure at the time of isolation release (they are 30 degrees thru/or 70 degrees at a dead center rear-brake-bell-crank angle).
Therefore, it is related with the device and method of making it into the energy preservation cycle which aims at large reduction of a public nuisance as approximation constant volume combustion at the same time it large-increases the rotational motion power before and behind the capital machine first half of the energy conversion efficiency around after [a dead center] 60 degrees (the degree of crank angle is omitted henceforth) (refer to drawing 1 B).

[0002]
[Description of the Prior Art]The outline of Japanese Patent Application No. 7-79292 (the 1st application), Isolation water-by-combustion injection in a diameter reduction main combustion chamber is mainly carried out among the means which make the usual both-way piston cycle an energy preservation cycle, and heat insulation non-cooler Seki is substantially provided for a diameter expansion combustion chamber as a combustion chamber of low temperature low pressure by energy conversion (it is large conversion to low-temperature superheated steam). The outline of Japanese Patent Application No. 8-27207 (the 2nd application) makes the reverse pendulum piston cycle of an invention specially the energy preservation cycle of various sorts. The outline of Japanese Patent Application No. 8-78414 (the 3rd application of a claim of priority) explains the principal part for making the usual both-way piston cycle into an energy preservation cycle. The outline of Japanese Patent Application No. 8-122114 (the 4th application of a claim of priority) provides the method and device which make the usual both-way piston cycle an energy preservation cycle. The outline of Japanese Patent Application No. 8-172752 (the 5th application of a claim of priority) provides the method and device which make the pendulum piston of an invention an energy preservation cycle specially. Therefore, all by isolation combustion in a diameter reduction main combustion chamber whose diameter was reduced suitably to the worst machine of the rotational motion power conversion efficiency near after [a dead center thru/or a dead center] 30 degree. Large increase (it acts as Noboru Oue of the pressure with a little fuel) of the heat energy is carried out by preservation savings, it acts as Noboru Oue of the thermal efficiency as giant roll power near in the capital machine first half of rotational motion power conversion efficiency, and large reduction of a public nuisance is aimed at by combustion at the time of approximation constant volume combustion and isolation release.

[0003]
[Problem(s) to be Solved by the Invention]If it is an energy preservation cycle like ****, in addition to the thing in which large reduction of a public nuisance is possible, since [infinite] many composition is possible, provide many composition, acting as Noboru Oue of the thermal efficiency, but. especially -- a pendulum piston crank chain -- structure -- it is easy, and since it is made to small lightweight high power, an invention is continued. namely, -- there is a portion whose power conversion efficiency is very bad in a both-way piston crank chain near after [a dead center thru/or a dead center] 30 degree -- the heat energy (heat energy more than a compression pressure) of the maximum [conventional technology] in this portion -- abbreviated, in order to consume all, In order that a great portion of heat energy may be used for increase of friction loss, etc., heat energy may almost be lost to the capital machine of power conversion efficiency, thermal efficiency may large-decrease and volume of combustion chamber may grow rapidly from the early stages of combustion, In order to become the non-constant volume combustion of the degree of pole of low-pressure low temperature and to carry out sudden shift at the worst burning-conditions combustion, if unburned-combustibles reduction combustion is used, it will become NOx increase combustion, if NOx reduction combustion is used, it will become unburned-combustibles increase combustion, and an exhaust gas public nuisance large-increases, and usual SUBJECT that thermal efficiency large-decreases and collides with a technical wall occurs.
[0004]Then, this invention as the device made into an energy preservation cycle, and a method, As isolation combustion in a diameter reduction (it unifies into example whose diameter was reduced to 1/5 below, and explains) main combustion chamber (drawing 1 A, drawing 2 A, and drawing 3 A) which limited to the portion near a dead center like drawing 1 and drawing 2 for example, whose diameter was reduced to 1/5, Plan the decrease of a major defect of fuel as 1 grade necessary minimum for 25 minutes, and a great portion of heat energy, for example, the heat energy of 24 grades for 25 minutes, carries out large increase (pressure Noboru Oue) of the energy use (cylinder capacity of a piston) near the dead center by preservation savings, Cancel the isolation combustion in a diameter reduction main combustion chamber at the time of the optimum after a dead center, for example, the amount of the maximum heat energy used or the maximum bearing load is moved to around 60 degrees after a dead center, With a micro high speed engine, as an exception the isolation release in front of after [a dead center] 30 degrees of drawing 1 A as effective by carrying out intensive use of the heat energy after a dead center before and after the capital machine first half of 60 degrees thru/or 90 degrees (60 degrees thru/or 90 degrees are called below the first half of a capital machine after a dead center). Go up the thermal efficiency and the specific output in the same compression ratio by leaps and bounds as a result, and make Noboru Oue of a compression ratio possible and it continues for a long time [approximation constant-volume-combustion] with the best burning conditions of high temperature high pressure by considering all the usual combustion periods (40 degrees thru/or 60 degrees) as the isolation combustion in a diameter reduction main combustion chamber, and this isolation release combustion, Carry out great approach (approximation constant volume combustion is called below) to constant volume combustion, and carry out the end of a perfect combustion short time, and. Let it be a key objective to provide the device and method of making it into an energy preservation cycle of carrying out the end of a perfect combustion short time further according to the ultra high-speed stirring premixed combustion by the maximum-pressure difference at the time of isolation release, and aiming at large reduction of a public nuisance as the devotion to large reduction of NOx being possible by making a possibility of discharging unburned combustibles there being nothing.
[0005]Since it is proved in the perfectly elastic collision in the case of a collision as for other purposes of this invention that kinetic energy does not decrease and the pendulum motion of a clock also has very few reduction losses of kinetic energy, It is making reciprocating movement of a piston into the device and method which the reduction loss of kinetic energy makes fewest energy preservation cycles. Other purposes of this invention, all the usual combustion periods -- combustion periods with the best burning conditions of the highest firing pressure and the

maximum temperature of combustion, and/— the high voltage moderate temperature long time isolation combustion which carried out energy conversion to the superheated-steam mass which added water injection suitably, and/— further by combustion gas ultra high-speed injection stirring combustion by the large pressure differential at the time of isolation release. It is considering it as the device and method of making carry out the end of moderate temperature perfect combustion of all the fuel, such as petroleum, propane, hydrogen, and natural gas methanol, regardless of the number of cycles, a fuel ignition system, and a scavenging-air method, and making it into NOx and the energy preservation cycle which brings unburned combustibles close simultaneously there being nothing. The reduction loss of kinetic energy is large-reduced, and other purposes of this invention are to consider it as the device and method of making it into the energy preservation cycle which contains the perfect reciprocating engine before and behind 70% of thermal efficiency by large-increasing by preservation savings and carrying out intensive use of a great portion of heat energy before or after the first half of a capital machine near the dead center. Other purposes of this invention have little vibration, and are considering it as small lightweight high power, the device made [overly] into the energy preservation cycle of large-sized lightweight high power, and a method. Other purposes of this invention are to consider it as the device and method of making it into the energy preservation cycle considered as the lean combustion in a diameter reduction main combustion chamber, theoretical-air-fuel-ratio combustion, overfuel combustion, and specific output increase combustion (combustion in which a short stroke organization is overly possible).

[0006]

[Means for Solving the Problem]In view of the above SUBJECT, volume of combustion chamber increases rapidly with piston descent, and this invention improves public nuisance increase combustion by non-constant volume combustion (drawing 1 D) of the degree of pole of conventional technology which carries out a temperature fall, For example, as isolation combustion in a diameter reduction main combustion chamber (drawing 1 A, drawing 2 A, and drawing 3 A) which limited near the dead center and whose diameter was reduced to 1/5, make it an energy preservation cycle mentioned later, and. As approximation constant volume combustion which carried out great approach to constant volume combustion of by-products, all the usual combustion periods (40 degrees thru/or 60 degrees) at the time of combustion with the best burning conditions of the highest firing-pressure maximum temperature of combustion, and isolation release by a maximum-pressure difference beyond /it as ultra high-speed combustion gas injection stirring premixed combustion, Bringing close an element which large-improves the combustion itself and to which unburned combustibles remain that there is nothing. In approximation constant volume combustion which sets capacity increase of conventional technology to 1, for example and in which 1/25 carries out capacity increase as amount of heat energy used equivalent to this approximation constant volume combustion (cylinder capacity of diameter reduction piston). Since preservation savings are carried out by a principle and approximation constant volume combustion of mechanical energy preservation and the amount of heat energy used carries out large increase (pressure Noboru Oue) (drawing 1 A) of the heat energy of 24-leak rate for 25 minutes to a diameter reduction main combustion chamber by them by 1/25, large reduction of fuel combustion mass is attained, Since intensive high speed injection use of the heat energy of 24/25 which large-increased at the time of isolation release (drawing 1 B) is carried out before or after the first half of a capital machine, Since bearing load becomes a /capital machine as super-best burning-conditions combustion with the maximum with an abbreviated maximum-pressure difference according to ultra high-speed injection stirring premixed combustion of combustion gas. It is considered as a device and a method of making it into giant roll power public nuisance large reduction combustion and /thermal efficiency including overfuel combustion in a /diameter reduction main combustion chamber as super-giant roll power, theoretical-air-fuel-ratio combustion, and lean combustion, and an energy preservation cycle in which lightweight large specific output simultaneous Noboru Oue is possible.

[0007]Although it is considered as reduction combustion of NOx by isolation combustion in a diameter reduction main combustion chamber with much residual gas, Since combustion temperature will also rise gradually and will serve as NOx increase combustion, if a combustion

chamber becomes large-sized gradually, Add a water injection system suitably and energy conversion of the hot temperature of combustion is carried out to low-temperature superheated-steam mass capacity, Substantially a diameter expansion combustion chamber as combustion chamber and dead volume of low temperature low pressure, and lean combustion in a /diameter reduction main combustion chamber, theoretical-air-fuel-ratio combustion and overfuel combustion, and -- large-reducing a vibration element near the /dead center --/as a diameter expansion combustion chamber in which a diameter expansion weight saving is substantially possible -- making heat insulation non-cooler Seki possible by a diameter expansion combustion chamber of low temperature low pressure substantially -- and/-- a short stroke organization is overly made possible and it is considered as a device and a method of making it into a very large energy preservation cycle of a range of choice, namely, -- if conventional technology is made into an energy preservation cycle -- a pending matter -- abbreviated, although [which is expected to exceed 55% of thermal efficiency of the conventional technology highest with a spark-ignition engine since there is an effect of the more than which acted as Noboru Oue of the compression ratio while large-reducing mechanical loss also with the same compression ratio, since it is all solved], In order to obtain a perfect reciprocating engine before and behind 70% of thermal efficiency, I expect that it is necessary reduce a reduction loss of kinetic energy just over or below 10%, and to bring it close further that there is nothing. That is, in a perfectly elastic collision, it is proved in the case of a collision that kinetic energy does not decrease, and reciprocating movement of a pendulum of a clock is also used as reciprocating movement with very few reduction losses of kinetic energy. Therefore, bring reciprocating movement of a piston close to a perfectly elastic collision, and a crank chain is also replaced by a pendulum motion crank chain, It plans reducing a reduction loss of kinetic energy just over or below 10% with a pendulum piston, and including a perfect reciprocating engine before and behind 70% of thermal efficiency by a device and a method of making a pendulum piston an energy preservation cycle.

[0008]a crank chain -- after a dead center thru/or a dead center -- heat energy of the maximum [portion / whose power conversion efficiency of 30 degrees is very bad / conventional technology / **** (drawing 1 D) and] (more than a compression pressure) in this portion -- abbreviated, in order to consume all, Since a great portion of heat energy is consumed by increase of friction loss, etc., heat energy is almost lost to a capital machine, torque large-decreases and volume of combustion chamber increases rapidly with descent of a piston, Since combustion temperature dives, it becomes the worst burning conditions with non-constant volume combustion of the degree of pole which carries out sudden shift, an exhaust gas public nuisance large-increases and thermal efficiency large-falls, this invention, It is the amount of the heat energy used near the dead center (capacity like a piston line) reducing fuel as necessary minimum, large-increasing by preservation savings (drawing 1 A), and carrying out intensive use before or after the capital machine first half of power conversion efficiency, And it brings the maximum bearing load close to a capital machine and considers it as giant roll power, act as Noboru Oue of /thermal efficiency and the lightweight large specific output simultaneously, and at the time of /approximation constant volume combustion and isolation release by combustion. Bring close a possibility that unburned combustibles will remain that there is nothing, and by and improvement of a /combustion method. Enable large increase of residual gas, and large reduction of NOx, and by and /approximation constant volume combustion. An effect (drawing 1 B) of the more than which enabled an addition of diameter reduction main-combustion-chamber inner-drainage injection, made heat insulation non-cooler Seki possible, considered it as public nuisance large reduction combustion regardless of a kind and a scavenging-air method of the number of /cycles, a fuel ignition system, and fuel, large-reduced /energy loss and mechanical loss, and large-increased a compression ratio is generated. Namely, as isolation combustion in a diameter reduction main combustion chamber whose diameter was reduced to 1/5 by providing a one-way airstream way for example, it limited near the dead center, Heat energy of 24 for abbreviated 25 minutes large-increases by preservation savings to a diameter reduction main combustion chamber, A great portion of heat energy is injected on a head of both head diameter expanded piston as speed form dynamic pressure large heat energy + displacement-type heat

energy by an abbreviated maximum-pressure difference, In conventional technology, by heat energy carrying out intensive use including the first half of a capital machine (drawing 1 C) in which it hardly remains, giant roll power of the more than which large-increased a compression ratio is generated, and large reduction of a discharge of diacid carbonizing matter is aimed at.
[0009]Like explanation by the above, in order that an improvement part may concentrate on a portion whose power conversion efficiency near the dead center is very bad, most solving means become delicate [explanation] and various by resemblance. namely, — increasing, since it is not changed into rotational motion power even if bearing load carries out the rapid increase large of the vibration mainly near the dead center -- and/, in order overly to consider it as large-sized lightweight high power and small lightweight high power, In order for that a low-pressure combustion chamber makes a high voltage combustion chamber a major diameter in a byway to obtain simultaneously /overfuel combustion, theoretical-air-fuel-ratio combustion, and lean combustion well, In order for a diameter reduction main combustion chamber to raise /thermal efficiency preferably, Well, in order to simplify /structure as /public nuisance reduction combustion being indispensable in two-step combustion of combustion at the time of approximation constant volume combustion and isolation release, moving the maximum bearing load to the first half side of a capital machine near the dead center reduces vibration, and it reduces the number of cylinders by large diameter expansion. Therefore, large-reduce the maximum bearing load by rise of a maximum combustion pressure in 1 grade for 25 minutes as isolation combustion in a diameter reduction main combustion chamber which limited near the dead center in any case for example, whose diameter was reduced to 1/5, and control vibration substantially, and. Large-sized lightweight high power etc. are overly substantially made possible as a diameter reduction main combustion chamber and a diameter expansion combustion chamber of thin meat, Carry out intensive injection of the heat energy of most which large-increased with an abbreviated maximum-pressure difference by combustion at the time of isolation release, move the maximum bearing load to the first half side of a capital machine, and it acts as Noboru Oue of the thermal efficiency, and large reduction of a public nuisance is aimed at by combustion at the time of approximation constant volume combustion and isolation release.

[0010]
[Embodiment of the Invention]although an embodiment of the invention is described with reference to drawings based on an example -- the example, having existing explained, and its composition -- abbreviated -- the same name or numerals is given to the same portion, the duplication explanation is omitted, and a characteristic portion and an explanation starved area are explained one by one. In order to explain concretely the place and anticipation which an invention means lucidly, it explains numerically, but it does not limit to a number. When vibration is reduced with reference to drawing 3 and drawing 4 and the 1st example of the device which makes a pendulum piston crank organization an energy preservation cycle, and a method is described, this invention, Enable the addition of water injection as best burning-conditions combustion (approximation constant volume combustion) of high temperature high pressure, and all of all the usual thermogeneration periods according to the ultra high-speed injection stirring premixed combustion (it burns at the time of isolation release) by the large pressure differential beyond /it. In order to adopt the isolation combustion in a diameter reduction main combustion chamber which carries out the end of perfect combustion of all the fuel quickly regardless of the kind, the fuel ignition system, the number of cycles, and scavenging-air method of fuel, it brings close simultaneously with unburned combustibles by concentrating on reduction of NOx that there is nothing. Therefore, reduction of combustion temperature serves as the biggest SUBJECT, combustion temperature is reduced by the addition of an energy conversion means (water injection system), NOx and unburned combustibles are brought close simultaneously that there is nothing, and heat insulation non-cooler Seki is also made possible in increase and the large-sized combustion chamber of residual gas. Gear and opposite reciprocating movement of both the head diameter expanded piston is synchronized with the synchronous means 1 and mechanical supercharger 2, It is preferred to challenge not less than 5 m in the outer diameter of both the head diameter expanded piston, reduce vibration, when it is made the perfectly elastic

collision which explodes alternately with right and left as a two cycle, it is still more desirable, and the further usual piston rod is replaced by a pendulum arm, It is still more preferred to carry out great approach to the pendulum motion of a clock according to a pendulum piston crank chain, and to reduce the reduction loss of kinetic energy just over or below 10%.

[0011]Both two head diameter expanded pistons (drawing 3 is an inner dead point position) that carry out opposite reciprocating movement between the inner dead points 3 and 3 and the outer dead points 3 and 3 in the cylinder formed in opposite in drawing 3 and drawing 4 are provided, It is making the both-sides head into the proper crevices 4, 4, 4, and 4 (crevice dished in drawing 3), It has composition which the speed form dynamic pressure large heat energy + displacement-type heat energy by which ultra high-speed injection is carried out with an abbreviated maximum-pressure difference from a diameter reduction main combustion chamber at the time of isolation release is used effectively, and reduces the heat load of a cylinder, Select the isolation combustion periods in a diameter reduction main combustion chamber with length, and the diameter reduction piston which makes a leak rate selectable, Make it project from the approximately center of the proper crevices 4, 4, 4, and 4, and the annular unevenness 5 which intersects perpendicularly in the movement direction of both the head diameter expanded piston in the peripheral face is formed in multistage, Leave the back end suitably, using the heights at the tip as broad, establish the noise-reduction slot 11 which extends aslant in the movement direction in a periphery, and enact the jet direction of injection combustion gas, and. Aim at reduction of noise, and in the body approximately center of both the head diameter expanded piston, form the insertion **** pendulum holes 6 and 6 and the piston side cams 7 and 7 in opposite with the semicircle orbits 8 and 8, and a pendulum arm rocks a pendulum arm vertically and horizontally with reciprocating movement of both the head diameter expanded piston, In order for the piston side cams 7 and 7 to enable rotation of the semicircle orbit 8-8 top rockable with rocking of a pendulum arm, and to inject high pressure combustion gas like drawing 4 and to large-reduce a cooling loss, A diameter reduction piston and the proper crevice 4 are made to form with the **-proof [heat-resistant] material 9 and the thermal insulation 10, Provide a cylinder head in the cylinder of ****, make the diameter expansion combustion chamber side project the proper crevice 4 and the heights 14 proper to approximately isomorphism, and in the approximately center. For example, carry out **** possession of the diameter reduction main combustion chamber whose diameter was reduced by 1 grade for 5 minutes of a diameter expansion combustion chamber, the inside is made to form with the **-proof [heat-resistant] material 9 and the thermal insulation 10, and it is considered as **********-proof [heat-resistant].

[0012]a central diameter reduction main combustion chamber makes each open for free passage -- structure -- easy and small -- as lightweight, when making a fuel ignition system into a compression ignition method, When the fuel injection equipment 18 is suitably provided according to the kind of fuel in the diameter reduction main combustion chamber of ****, the glow hotspot etc. which are not in a figure are added like usual and it is considered as a jump-spark-ignition method, If the ignition plug etc. which are not in the fuel injection equipment 18 and a figure suitably according to the kind of fuel are provided in the diameter reduction main combustion chamber of **** and a diameter reduction main combustion chamber becomes large gradually, Since the combustion fuel mass and the burning time of the same combustion periods (the degree of the same crank angle) increase gradually and serve as high temperature combustion, in increase of residual gas, and shortening of isolation combustion periods. the water injection system 19 of an energy conversion means to inject the water of a high voltage elevated temperature in a diameter reduction main combustion chamber since reduction of NOx becomes difficult gradually -- **** -- it adding suitably and, As a means to heat the water, at least one or more means in the arbitrary exhaust air part heat exchange means 41 shown in drawing 7 thru/or drawing 10, the diameter reduction part heat exchange means 42, and the combustion part heat exchange means 43 are made selectable, Generation of NOx is large-controlled, and a possibility that heat insulation non-cooler Seki will be substantially made possible as a combustion chamber of low temperature low pressure, and unburned combustibles will remain a /diameter expansion combustion chamber by combustion at the time of /approximation

constant volume combustion and isolation release is eliminated, and large reduction of a public nuisance is aimed at. For example, the diameter reduction piston whose diameter was reduced by 1/5 of both the head diameter expanded piston, Since cylinder capacity is reduced to 1/25, when the amount of the heat energy used drops to 1/25 and there is no disclosure, Since preservation savings are carried out and the heat energy of 24/25 large-increases to a diameter reduction main combustion chamber, Heat energy large-increases, carrying out the decrease of a major defect of the fuel (drawing 1 A), and heat insulation non-cooler Seki which added water injection is made possible, Move the maximum bearing load to the first half side of a capital machine by isolation combustion release (drawing 1 B), generate giant roll power, and large reduction of a public nuisance is enabled by combustion at the time of approximation constant volume combustion and isolation release, a possibility that ultra high-speed injection stirring premixed combustion (drawing 1 B) of the combustion gas of an abbreviated maximum-pressure difference will be carried out by the two-step combustion, and unburned combustibles will remain -- abbreviated -- it is made for there to be nothing.

[0013]Namely, in conventional technology near [like drawing 1 D / where power conversion efficiency is the worst] the dead center (after a dead center thru/or a dead center 30 degrees), In order to consume all the abbreviation for the greatest (more than a compression pressure) heat energy (only the amount used decreases), Since a great portion of heat energy is consumed by increase of friction loss, etc., becomes small [heat energy] at a capital machine and serves as large reduction of thermal efficiency, It is preferred for 30 degrees to make usual isolation combustion in a diameter reduction main combustion chamber after a dead center, to enable isolation-30 degrees ago combustion release of a small high speed engine as an exception, and to make the amount of the heat energy used near the dead center into the required minimum. Therefore, although the wire extension of a diameter reduction piston is adjusted and isolation combustion periods are selected, Although ultra high-speed injection stirring combustion of injection stirring combustion/or the unburnt glow gas is mainly carried out and the end of perfect combustion of the end gas of perfect combustion is carried out with an abbreviated maximum-pressure difference at the time of isolation release, Fuel[theoretical air fuel ratio / in a diameter reduction main combustion chamber / combustion, or / over]-burn, or mainly concern, and make the limit of lean combustion possible, and. Although it limits near the dead center and the combustion maximum bearing loads other than a compression pressure are large-reduced, for example in 1 grade for 25 minutes of conventional technology, the maximum bearing load is moved to the first half side of a capital machine and vibrational energy is large-reduced, the means which carries out the end of high speed injection stirring perfect combustion is needed reducing the noise at the time of isolation release. Therefore, like drawing 4 in the peripheral face of a diameter reduction piston. Form many annular unevenness 5 which intersects perpendicularly in the movement direction of both the head diameter expanded piston, and the heights at the tip are made broad, Form two or more noise-reduction slots 11 which leave the Motobe suitably and extend aslant to the movement direction of both the head diameter expanded piston in the peripheral face, and noise is reduced, and the jet of high speed injection gas is enacted, stirring premixed combustion is promoted, it injects to both the head diameter expanded piston effectively, and increase of torque is aimed at. Composition indispensable in order to consider it as an energy preservation cycle as isolation combustion in a diameter reduction main combustion chamber, It is establishing the one-way airstream way 21 in which the proper check valve 20 containing the reed valve which makes possible only the flow which opens a diameter reduction main combustion chamber and a diameter expansion combustion chamber for free passage, and goes to a diameter reduction main combustion chamber was formed in a cylinder head at least 1 or more sets. Make increase of compression power into the minimum by this one-way airstream way 21, and enable the rise of a compression ratio, and. As an energy preservation cycle, as isolation combustion in a diameter reduction main combustion chamber whose diameter was reduced by 1/5, for example, large-reduce a public nuisance and friction loss, and by two-step combustion of combustion at the time of approximation constant volume combustion and isolation release. While preservation savings save fuel, it acts as Noboru Oue (it is large increase about heat energy) of the highest firing pressure, and the maximum

bearing load is moved to the first half side of a capital machine (drawing 1 B), a great portion of heat energy is changed into giant roll power, and Noboru Oue of thermal efficiency and large reduction of a public nuisance are aimed at.

[0014]In the body approximately center of the cylinder which carried out **** accommodation of both the head diameter expanded piston, and made right and left constitute a **** diameter expansion combustion chamber like drawing 3, drawing 4, and drawing 5. In order for a pendulum arm to carry out pendulum motion with reciprocating movement of both the head diameter expanded piston of ****, to rotate the crankshaft 25 supported pivotably in the lower end of **** and to obtain power, The diameter expansion combustion chamber which penetrated the cylinder bores 22 and 22, established suitably in **** the flue outlet 23 exhausted from the diameter expansion combustion chamber of ****, and established suitably in **** the scavenging-air entrance 24 which scavenges the diameter expansion combustion chamber of **** for example, whose diameter was expanded by 5 times the diameter reduction main combustion chamber is made to constitute. That is, light-gage lightweight high power becomes possible from conventional technology at the large width to which the diameter expansion combustion chamber reduced the maximum bearing load near the dead center in 1 grade for 25 minutes by isolation combustion in a diameter reduction main combustion chamber since addition of the water injection system 19 was also possible to large diameter expansion, no heat insulation cooling, and large width low vibration and low temperature, and for low pressure. the pendulum arm which carries out pendulum motion with opposite reciprocating movement of both the head diameter expanded piston -- the upper and lower sides -- reciprocation — easily the crankshafts 25 and 25 to the lower end of a pendulum arm, [support pivotably and] The middle of the pendulum arm among the piston side cams 7 and 7 supported enabling free rotation while moving the semicircle orbits 8 and 8 **** insertion ****, Moving the semicircle orbits 8 and 8, among the main part side cams 26 and 26 supported enabling free rotation, the pendulum arm of **** rocks to the right-and-left upper and lower sides with opposite reciprocating movement of **** insertion **** and both the head diameter expanded piston, the crankshafts 25 and 25 are rotated, and the upper bed of the pendulum arm also transmits power. The engagement synchronous means 1 and mechanical supercharger 2 which synchronizes opposite reciprocating movement of both the head diameter expanded piston, Earlier application is made to constitute suitably including the mechanical supercharger 31 and the synchronous means 32 of a statement. Adhere to the crankshafts 25 and 25 and the air outlet 27 is connected to the scavenging-air entrance 24 like drawing 7 thru/or drawing 10, The air inlet 28 is connected to the air inlet 28 via the exit of the usual turbosupercharger 29, and the turbosupercharger 29 scavenges a diameter expansion combustion chamber from the scavenging-air entrance 24 directly by a turbosupercharger, when connecting with the flue outlet 23, operating by exhaust air and not using the mechanical supercharger 2 like usual.

[0015]When an output is small, or when it constitutes as simply as possible, it may be made the 2nd example of drawing 2. Namely, in the overly large-sized isolation combustion in a diameter reduction main combustion chamber, in order to reduce vibration to a limit and to reach to an extreme of the limit of high power, and the limit of low vibration, synchronize an opposite piston, but. Since there is little heat energy changed into vibration near the dead center in order to limit near the dead center in an energy preservation cycle and to large-reduce the maximum bearing load etc. in 1 grade for 25 minutes as 1 grade for 25 minutes of conventional technology, vibration is also due to decrease, After approaching the first half side of a capital machine, in order to carry out isolation combustion release, the vibrational energy of conventional technology is changed into rotational motion power, and it is considered as giant roll power. Therefore, since vibration is large-reduced also as the 2nd example of drawing 2 and giant roll power is obtained, I expect that utilization is possible. Since both the head diameter expansion screw ton of the 1st example will be one piece, it is possible to provide the valve gear and inlet valve which are not in a figure, and to consider it as a four-cycle engine. Drawing 2 is what was made into the two-cycle uniflow-scavenging pendulum piston energy conserved cycle engine which reduced reduction (as a perfectly elastic collision and pendulum motion) of a reduction loss of kinetic energy, increase of a specific output, and the heat load of the cylinder, Therefore,

the flue outlet 23 is replaced by the exhaust valve 30 and the scavenging-air entrance 24. Since the crankshaft 25 of drawing 5 becomes other points of difference one, and/or the engagement synchronous means 1 becomes unnecessary and makes it a two-step supercharge method with the turbosupercharger 29 as the arbitrary mechanical superchargers 2, it is preferred to consider it as the above-mentioned two-cycle engine which uses any one supercharger.

[0016]Drawing 5 thru/or drawing 10 quote drawing 5 thru/or drawing 10 of Japanese Patent Application No. 8-172752 (the 5th application of a claim of priority) as it is. For example, the engagement synchronous means 1 and mechanical supercharger 2 which synchronizes opposite reciprocating movement of both the head diameter expanded piston of **** of drawing 3. Although gear like drawing 5, and the synchronous means 1 and mechanical supercharger 2 is made to constitute from what two gears are engaged and the crankshaft 25 of **** is rotated for (an engagement fan is included) and sent out from the air outlet 27 from the air inlet 28 like usual (refer to drawing 7 thru/or drawing 10), When not using the engagement synchronous means 1 and mechanical supercharger 2 as the mechanical supercharger 2, it is used as the engagement synchronous means 1, and when the engagement synchronous means 1 is unnecessary like drawing 2, it is used like usual, forming the flywheel which is not in a figure. Although a 1 cylinder (one combustion chamber) is connected with the crankshaft 25 in conventional technology, In order to connect 2 cylinder (2 diameter-expansion combustion chamber) in a pendulum piston crank chain, when considering it as a multi-cylinder engine, It is considered as many cylinders with 2 cylinder, a 4-cylinder, and 6-cylinder one at a 2 cylinder unit, and is made a 4-cylinder, 8 cylinder, and a twelve cylinder with a multi-cylinder engine by 4-cylinder unit by drawing 3 of two crankshafts at drawing 2 of one crankshaft. The check valve 20 of drawing 6 opens a diameter reduction main combustion chamber and a diameter expansion combustion chamber for free passage, are for making the one-way airstream way 21 which makes possible only the flow which goes to a diameter reduction main combustion chamber constitute, if the one-way airstream way 21 can be formed in a cylinder head, will not ask the composition of the check valve 20 including a reed valve, but. Since the heat load of the check valve 20 is reduced and the dead volume of a diameter reduction main combustion chamber can be expanded if insertion ****** is carried out from the diameter expansion combustion chamber side, it is desirable in order to make in use a super-lean-combustion two-cycle engine. Therefore, where press energizing of the valve element 37 is carried out to the valve seat 36 by the valve spring 38, insertion ****** of the check valve 20 of drawing 6 is carried out from the diameter expansion combustion chamber side, and the one-way airstream way 21 is made to form in the one-way airstream way 21. As for the slanting airstream way 39 which makes disorder form by the airstream injected from the one-way airstream way 21, and promotes combustion of injected fuel, it is preferred to provide in the **-proof [heat-resistant] material 9 of the neighborhood which is not closed by the diameter reduction piston or its part.

[0017]If isolation combustion in a diameter reduction main combustion chamber is used, although various energy preservation cycles are possible as an energy preservation cycle which does not almost have a possibility that unburned combustibles will remain, a piston cycle by two-step combustion of combustion at the time of approximation constant volume combustion and isolation release, Since it becomes NOx increase combustion even if the highest firing pressure acts as Noboru Oue by preservation savings in a large-sized combustion chamber, and residual gas is increased to a limit, even if it will use the limit of lean combustion, if approximation constant volume combustion is used, and it shortens isolation combustion periods to a limit, As an energy preservation cycle which added the water injection system 19 in the diameter reduction main combustion chamber, various kinds of moderate temperature isolation combustion is enabled. If various moderate temperature isolation combustion is explained with reference to drawing 7 thru/or drawing 10, in the device and method of making it into A type energy preservation cycle of drawing 7. Since there are few possibilities of discharging unburned combustibles like ****, it concentrates on reduction of NOx according to reduction (super lean combustion in a diameter reduction main combustion chamber) of fuel, and increase of residual gas, Aim at large reduction of a public nuisance and unburned combustibles are further made for there to be nothing by combustion at the time of diameter reduction main-combustion-chamber

isolation release, It injects on the head of a diameter expanded piston as speed form dynamic pressure large heat energy + static pressure heat energy, and changes into giant roll power in a diameter expansion combustion chamber, high power is generated and it discharges from the flue outlet 23, and the turbosupercharger 29 is operated by the exhaust air, suction air is pressurized, and exhaust air is exhausted from an exhaust air part. The pressurized air may scavenge a diameter expansion combustion chamber from the air outlet 27 as it is, and also pressurizes it by mechanical supercharge mind via the air inlet 28, It shifts to the isolation combustion in a diameter reduction main combustion chamber which utilized the one-way airstream way 21 and the diameter reduction piston, using super-high supercharge as selectable at the scavenging-air entrance 24 of a diameter expansion combustion chamber.

[0018]The device made into B type energy preservation cycle of drawing 8, Since it will shift to increase combustion of NOx if a combustion chamber becomes large-sized gradually, the water injection system 19 is added to A type energy preservation cycle, Even if energy conversion of the hot temperature of combustion is carried out to low-temperature superheated-steam mass capacity and the highest firing pressure goes up substantially by preservation savings, An energy conversion means (water injection system) is added to increase of lean combustion and residual gas, and generation of NOx is close brought that there is nothing by isolation combustion in the diameter main combustion chamber of moderate temperature high compression. Therefore, as shown in drawing 4, add the water injection system 19 suitably, and/or the fuel injection equipment 18 and the water injection system 19 are united suitably, Generation of NOx is close brought for the highest firing pressure as moderate temperature high voltage isolation combustion which can go up substantially that there is nothing by the addition of an energy conversion means to inject the high voltage high temperature hot water heated by the arbitrary exhaust air part heat exchange means 41 from the water injection system 19 of **** controlled by the control apparatus 40. The device made into C type energy preservation cycle of drawing 9, From the water injection system 19 of ****, add the diameter reduction part heat exchange means 42 to B type energy preservation cycle, inject a lot of high voltage high temperature hot water further heated by the elevated temperature by the control apparatus 40, and according to increase of the amount of energy conversion. Generation of NOx is close brought as moderate temperature high voltage isolation combustion which can go up substantially that there is nothing, and offer of heat insulation non-cooler Seki of the highest firing pressure is enabled for the theoretical air fuel ratio in a diameter reduction main combustion chamber, overfuel, and lean combustion. The device made into D type energy preservation cycle of drawing 10, Add the combustion part heat exchange means 43 to C type energy preservation cycle, and also large increase of the amount of energy conversion is enabled by enabling injection of a lot of high voltage high temperature hot water heated by the elevated temperature, It injects from the water injection system 19 of **** controlled by the control apparatus 40, and generation of NOx is made for there to be nothing for the highest firing pressure as moderate temperature high voltage isolation combustion which can go up substantially.

[0019]

[Effect of the Invention]This invention does many effects so, as explained above, but, especially -- conventional technology -- after the dead center when power conversion efficiency is the worst thru/or a dead center -- by 30 degrees -- the maximum heat energy (heat energy more than a compression pressure) -- abbreviated, in order to consume all (drawing 1 D) (a used part decreases), In addition to the thing whose efficiency changed into rotational motion power is very bad, thermal efficiency was large-decreasing according to large increase of friction loss, but, The amount of the heat energy used up to 30 degrees after a dead center thru/or a dead center by considering it as an energy preservation cycle by large-decreasing, for example in 1 grade for 25 minutes, By carrying out large increase (he is Noboru Oue about a firing pressure) of the heat energy by preservation savings, large-reducing mechanical loss and fuel combustion mass, and carrying out isolation combustion release in a diameter reduction main combustion chamber, making the heat energy of 24 grades for 25 minutes reveal suitably. There is an effect which generates the large effect of the more than which large-increased the compression ratio by conventional technology by an energy preservation cycle and to which it acts as Noboru Oue

of the thermal efficiency with giant roll power, and in conventional technology. In order to consume all the abbreviation for the maximum heat energy by 30 degrees after a dead center thru/or a dead center, reduction of the public nuisance was dramatically difficult because of the non-constant volume combustion of the degree of pole in which volume of combustion chamber grows rapidly, sudden shift is carried out at the worst burning conditions of low-pressure low temperature, and combustion gets worse quickly, but. Enable large increase of residual gas by two-step combustion of combustion at the time of the approximation constant volume combustion of the by-product of an energy preservation cycle, and isolation release, and heat insulation non-cooler Seki is made possible by the proper addition of a /energy conversion means or a heat exchange means, There is a big effect of acting as Noboru Oue of the thermal efficiency regardless of the kind, the ignition system, the number of cycles, and scavenging-air method of fuel, and bringing NOx and unburned combustibles close simultaneously there being nothing by isolation combustion in a diameter reduction main combustion chamber of all sizes.

[Translation done.]

MEANS

[Means for Solving the Problem]In view of the above SUBJECT, volume of combustion chamber increases rapidly with piston descent, and this invention improves public nuisance increase combustion by non-constant volume combustion (drawing 1 D) of the degree of pole of conventional technology which carries out a temperature fall, For example, as isolation combustion in a diameter reduction main combustion chamber (drawing 1 A, drawing 2 A, and drawing 3 A) which limited near the dead center and whose diameter was reduced to 1/5, make it an energy preservation cycle mentioned later, and. As approximation constant volume combustion which carried out great approach to constant volume combustion of by-products, all the usual combustion periods (40 degrees thru/or 60 degrees) at the time of combustion with the best burning conditions of the highest firing-pressure maximum temperature of combustion, and isolation release by a maximum-pressure difference beyond /it as ultra high-speed combustion gas injection stirring premixed combustion, Bringing close an element which large-improves the combustion itself and to which unburned combustibles remain that there is nothing, In approximation constant volume combustion which sets capacity increase of conventional technology to 1, for example and in which 1/25 carries out capacity increase as amount of heat energy used equivalent to this approximation constant volume combustion (cylinder capacity of diameter reduction piston). Since preservation savings are carried out by a principle and approximation constant volume combustion of mechanical energy preservation and the amount of heat energy used carries out large increase (pressure Noboru Oue) (drawing 1 A) of the heat energy of 24-leak rate for 25 minutes to a diameter reduction main combustion chamber by them by 1/25, large reduction of fuel combustion mass is attained, Since intensive high speed injection use of the heat energy of 24/25 which large-increased at the time of isolation release (drawing 1 B) is carried out before or after the first half of a capital machine, Since bearing load becomes a /capital machine as super-best burning-conditions combustion with the maximum with an abbreviated maximum-pressure difference according to ultra high-speed injection stirring premixed combustion of combustion gas. It is considered as a device and a method of making it into giant roll power public nuisance large reduction combustion and /thermal efficiency including overfuel combustion in a /diameter reduction main combustion chamber as super-giant roll power, theoretical-air-fuel-ratio combustion, and lean combustion, and an energy preservation cycle in which lightweight large specific output simultaneous Noboru Oue is possible.
[0007]Although it is considered as reduction combustion of NOx by isolation combustion in a diameter reduction main combustion chamber with much residual gas, Since combustion temperature will also rise gradually and will serve as NOx increase combustion, if a combustion chamber becomes large-sized gradually, Add a water injection system suitably and energy conversion of the hot temperature of combustion is carried out to low-temperature superheated-steam mass capacity, Substantially a diameter expansion combustion chamber as combustion chamber and dead volume of low temperature low pressure, and lean combustion in a /diameter reduction main combustion chamber, theoretical-air-fuel-ratio combustion and overfuel combustion. and -- large-reducing a vibration element near the /dead center --/as a diameter expansion combustion chamber in which a diameter expansion weight saving is substantially possible -- making heat insulation non-cooler Seki possible by a diameter

expansion combustion chamber of low temperature low pressure substantially — and/— a short stroke organization is overly made possible and it is considered as a device and a method of making it into a very large energy preservation cycle of a range of choice. namely, — if conventional technology is made into an energy preservation cycle — a pending matter — abbreviated, although [which is expected to exceed 55% of thermal efficiency of the conventional technology highest with a spark-ignition engine since there is an effect of the more than which acted as Noboru Oue of the compression ratio while large-reducing mechanical loss also with the same compression ratio, since it is all solved], In order to obtain a perfect reciprocating engine before and behind 70% of thermal efficiency, I expect that it is necessary reduce a reduction loss of kinetic energy just over or below 10%, and to bring it close further that there is nothing. That is, in a perfectly elastic collision, it is proved in the case of a collision that kinetic energy does not decrease, and reciprocating movement of a pendulum of a clock is also used as reciprocating movement with very few reduction losses of kinetic energy. Therefore, bring reciprocating movement of a piston close to a perfectly elastic collision, and a crank chain is also replaced by a pendulum motion crank chain, It plans reducing a reduction loss of kinetic energy just over or below 10% with a pendulum piston, and including a perfect reciprocating engine before and behind 70% of thermal efficiency by a device and a method of making a pendulum piston an energy preservation cycle.

[0008]a crank chain — after a dead center thru/or a dead center — heat energy of the maximum [portion / whose power conversion efficiency of 30 degrees is very bad / conventional technology / **** (drawing 1 D) and] (more than a compression pressure) in this portion — abbreviated, in order to consume all, Since a great portion of heat energy is consumed by increase of friction loss, etc., heat energy is almost lost to a capital machine, torque large-decreases and volume of combustion chamber increases rapidly with descent of a piston. Since combustion temperature dives, it becomes the worst burning conditions with non-constant volume combustion of the degree of pole which carries out sudden shift, an exhaust gas public nuisance large-increases and thermal efficiency large-falls, this invention, It is the amount of the heat energy used near the dead center (capacity like a piston line) reducing fuel as necessary minimum, large-increasing by preservation savings (drawing 1 A), and carrying out intensive use before or after the capital machine first half of power conversion efficiency, And it brings the maximum bearing load close to a capital machine and considers it as giant roll power, act as Noboru Oue of /thermal efficiency and the lightweight large specific output simultaneously, and at the time of /approximation constant volume combustion and isolation release by combustion. Bring close a possibility that unburned combustibles will remain that there is nothing, and by and improvement of a /combustion method. Enable large increase of residual gas, and large reduction of NOx, and by and /approximation constant volume combustion. An effect (drawing 1 B) of the more than which enabled an addition of diameter reduction main-combustion-chamber inner-drainage injection, made heat insulation non-cooler Seki possible, considered it as public nuisance large reduction combustion regardless of a kind and a scavenging-air method of the number of /cycles, a fuel ignition system, and fuel, large-reduced /energy loss and mechanical loss, and large-increased a compression ratio is generated. Namely, as isolation combustion in a diameter reduction main combustion chamber whose diameter was reduced to 1/5 by providing a one-way airstream way for example, it limited near the dead center, Heat energy of 24 for abbreviated 25 minutes large-increases by preservation savings to a diameter reduction main combustion chamber, A great portion of heat energy is injected on a head of both head diameter expanded piston as speed form dynamic pressure large heat energy + displacement-type heat energy by an abbreviated maximum-pressure difference, In conventional technology, by heat energy carrying out intensive use including the first half of a capital machine (drawing 1 C) in which it hardly remains, giant roll power of the more than which large-increased a compression ratio is generated, and large reduction of a discharge of diacid carbonizing matter is aimed at.

[0009]Like explanation by the above, in order that an improvement part may concentrate on a portion whose power conversion efficiency near the dead center is very bad, most solving means become delicate [explanation] and various by resemblance. namely, — increasing, since it is not changed into rotational motion power even if bearing load carries out the rapid increase large of

the vibration mainly near the dead center -- and/, in order overly to consider it as large-sized lightweight high power and small lightweight high power, In order for that a low-pressure combustion chamber makes a high voltage combustion chamber a major diameter in a byway to obtain simultaneously /overfuel combustion, theoretical-air-fuel-ratio combustion, and lean combustion well, In order for a diameter reduction main combustion chamber to raise /thermal efficiency preferably, Well, in order to simplify /structure as /public nuisance reduction combustion being indispensable in two-step combustion of combustion at the time of approximation constant volume combustion and isolation release, moving the maximum bearing load to the first half side of a capital machine near the dead center reduces vibration, and it reduces the number of cylinders by large diameter expansion. Therefore, large-reduce the maximum bearing load by rise of a maximum combustion pressure in 1 grade for 25 minutes as isolation combustion in a diameter reduction main combustion chamber which limited near the dead center in any case for example, whose diameter was reduced to 1/5, and control vibration substantially, and. Large-sized lightweight high power etc. are overly substantially made possible as a diameter reduction main combustion chamber and a diameter expansion combustion chamber of thin meat, Carry out intensive injection of the heat energy of most which large-increased with an abbreviated maximum-pressure difference by combustion at the time of isolation release, move the maximum bearing load to the first half side of a capital machine, and it acts as Noboru Oue of the thermal efficiency, and large reduction of a public nuisance is aimed at by combustion at the time of approximation constant volume combustion and isolation release.

[0010]

[Embodiment of the Invention]although an embodiment of the invention is described with reference to drawings based on an example -- the example, having existing explained, and its composition -- abbreviated -- the same name or numerals is given to the same portion, the duplication explanation is omitted, and a characteristic portion and an explanation starved area are explained one by one. In order to explain concretely the place and anticipation which an invention means lucidly, it explains numerically, but it does not limit to a number. When vibration is reduced with reference to drawing 3 and drawing 4 and the 1st example of the device which makes a pendulum piston crank organization an energy preservation cycle, and a method is described, this invention, Enable the addition of water injection as best burning-conditions combustion (approximation constant volume combustion) of high temperature high pressure, and all of all the usual thermogeneration periods according to the ultra high-speed injection stirring premixed combustion (it burns at the time of isolation release) by the large pressure differential beyond /it. In order to adopt the isolation combustion in a diameter reduction main combustion chamber which carries out the end of perfect combustion of all the fuel quickly regardless of the kind, the fuel ignition system, the number of cycles, and scavenging-air method of fuel, it brings close simultaneously with unburned combustibles by concentrating on reduction of NOx that there is nothing, Therefore, reduction of combustion temperature serves as the biggest SUBJECT, combustion temperature is reduced by the addition of an energy conversion means (water injection system), NOx and unburned combustibles are brought close simultaneously that there is nothing, and heat insulation non-cooler Seki is also made possible in increase and the large-sized combustion chamber of residual gas. Gear and opposite reciprocating movement of both the head diameter expanded piston is synchronized with the synchronous means 1 and mechanical supercharger 2, It is preferred to challenge not less than 5 m in the outer diameter of both the head diameter expanded piston, reduce vibration, when it is made the perfectly elastic collision which explodes alternately with right and left as a two cycle, it is still more desirable, and the further usual piston rod is replaced by a pendulum arm, It is still more preferred to carry out great approach to the pendulum motion of a clock according to a pendulum piston crank chain, and to reduce the reduction loss of kinetic energy just over or below 10%.

[0011]Both two head diameter expanded pistons (drawing 3 is an inner dead point position) that carry out opposite reciprocating movement between the inner dead points 3 and 3 and the outer dead points 3 and 3 in the cylinder formed in opposite in drawing 3 and drawing 4 are provided, It is making the both-sides head into the proper crevices 4, 4, 4, and 4 (crevice dished in drawing

3), It has composition which the speed form dynamic pressure large heat energy + displacement-type heat energy by which ultra high-speed injection is carried out with an abbreviated maximum-pressure difference from a diameter reduction main combustion chamber at the time of isolation release is used effectively, and reduces the heat load of a cylinder, Select the isolation combustion periods in a diameter reduction main combustion chamber with length, and the diameter reduction piston which makes a leak rate selectable, Make it project from the approximately center of the proper crevices 4, 4, 4, and 4, and the annular unevenness 5 which intersects perpendicularly in the movement direction of both the head diameter expanded piston in the peripheral face is formed in multistage. Leave the back end suitably, using the heights at the tip as broad, establish the noise-reduction slot 11 which extends aslant in the movement direction in a periphery, and enact the jet direction of injection combustion gas, and. Aim at reduction of noise, and in the body approximately center of both the head diameter expanded piston, form the insertion **** pendulum holes 6 and 6 and the piston side cams 7 and 7 in opposite with the semicircle orbits 8 and 8, and a pendulum arm rocks a pendulum arm vertically and horizontally with reciprocating movement of both the head diameter expanded piston, In order for the piston side cams 7 and 7 to enable rotation of the semicircle orbit 8-8 top rockable with rocking of a pendulum arm, and to inject high pressure combustion gas like drawing 4 and to large-reduce a cooling loss, A diameter reduction piston and the proper crevice 4 are made to form with the **-proof [heat-resistant] material 9 and the thermal insulation 10, Provide a cylinder head in the cylinder of ****, make the diameter expansion combustion chamber side project the proper crevice 4 and the heights 14 proper to approximately isomorphism, and in the approximately center. For example, carry out **** possession of the diameter reduction main combustion chamber whose diameter was reduced by 1 grade for 5 minutes of a diameter expansion combustion chamber, the inside is made to form with the **-proof [heat-resistant] material 9 and the thermal insulation 10, and it is considered as **********-proof [heat-resistant].

[0012]a central diameter reduction main combustion chamber makes each open for free passage -- structure -- easy and small -- as lightweight, when making a fuel ignition system into a compression ignition method, When the fuel injection equipment 18 is suitably provided according to the kind of fuel in the diameter reduction main combustion chamber of ****, the glow hotspot etc. which are not in a figure are added like usual and it is considered as a jump-spark-ignition method, If the ignition plug etc. which are not in the fuel injection equipment 18 and a figure suitably according to the kind of fuel are provided in the diameter reduction main combustion chamber of **** and a diameter reduction main combustion chamber becomes large gradually, Since the combustion fuel mass and the burning time of the same combustion periods (the degree of the same crank angle) increase gradually and serve as high temperature combustion, in increase of residual gas, and shortening of isolation combustion periods. the water injection system 19 of an energy conversion means to inject the water of a high voltage elevated temperature in a diameter reduction main combustion chamber since reduction of NOx becomes difficult gradually -- **** -- it adding suitably and, As a means to heat the water, at least one or more means in the arbitrary exhaust air part heat exchange means 41 shown in drawing 7 thru/or drawing 10, the diameter reduction part heat exchange means 42, and the combustion part heat exchange means 43 are made selectable, Generation of NOx is large-controlled, and a possibility that heat insulation non-cooler Seki will be substantially made possible as a combustion chamber of low temperature low pressure, and unburned combustibles will remain a /diameter expansion combustion chamber by combustion at the time of /approximation constant volume combustion and isolation release is eliminated, and large reduction of a public nuisance is aimed at. For example, the diameter reduction piston whose diameter was reduced by 1/5 of both the head diameter expanded piston, Since cylinder capacity is reduced to 1/25, when the amount of the heat energy used drops to 1/25 and there is no disclosure, Since preservation savings are carried out and the heat energy of 24/25 large-increases to a diameter reduction main combustion chamber, Heat energy large-increases, carrying out the decrease of a major defect of the fuel (drawing 1 A), and heat insulation non-cooler Seki which added water injection is made possible, Move the maximum bearing load to the first half side of a capital

machine by isolation combustion release (drawing 1 B), generate giant roll power, and large reduction of a public nuisance is enabled by combustion at the time of approximation constant volume combustion and isolation release, a possibility that ultra high-speed injection stirring premixed combustion (drawing 1 B) of the combustion gas of an abbreviated maximum-pressure difference will be carried out by the two-step combustion, and unburned combustibles will remain -- abbreviated -- it is made for there to be nothing.

[0013]Namely, in conventional technology near [like drawing 1 D / where power conversion efficiency is the worst] the dead center (after a dead center thru/or a dead center 30 degrees), In order to consume all the abbreviation for the greatest (more than a compression pressure) heat energy (only the amount used decreases), Since a great portion of heat energy is consumed by increase of friction loss, etc., becomes small [heat energy] at a capital machine and serves as large reduction of thermal efficiency, It is preferred for 30 degrees to make usual isolation combustion in a diameter reduction main combustion chamber after a dead center, to enable isolation-30 degrees ago combustion release of a small high speed engine as an exception, and to make the amount of the heat energy used near the dead center into the required minimum. Therefore, although the wire extension of a diameter reduction piston is adjusted and isolation combustion periods are selected, Although ultra high-speed injection stirring combustion of injection stirring combustion/or the unburnt glow gas is mainly carried out and the end of perfect combustion of the end gas of perfect combustion is carried out with an abbreviated maximum-pressure difference at the time of isolation release, Fuel[theoretical air fuel ratio / in a diameter reduction main combustion chamber / combustion, or / over]-burn, or mainly concern, and make the limit of lean combustion possible, and. Although it limits near the dead center and the combustion maximum bearing loads other than a compression pressure are large-reduced, for example in 1 grade for 25 minutes of conventional technology, the maximum bearing load is moved to the first half side of a capital machine and vibrational energy is large-reduced, the means which carries out the end of high speed injection stirring perfect combustion is needed reducing the noise at the time of isolation release. Therefore, like drawing 4 in the peripheral face of a diameter reduction piston. Form many annular unevenness 5 which intersects perpendicularly in the movement direction of both the head diameter expanded piston, and the heights at the tip are made broad, Form two or more noise-reduction slots 11 which leave the Motobe suitably and extend aslant to the movement direction of both the head diameter expanded piston in the peripheral face, and noise is reduced, and the jet of high speed injection gas is enacted, stirring premixed combustion is promoted, it injects to both the head diameter expanded piston effectively, and increase of torque is aimed at. Composition indispensable in order to consider it as an energy preservation cycle as isolation combustion in a diameter reduction main combustion chamber, It is establishing the one-way airstream way 21 in which the proper check valve 20 containing the reed valve which makes possible only the flow which opens a diameter reduction main combustion chamber and a diameter expansion combustion chamber for free passage, and goes to a diameter reduction main combustion chamber was formed in a cylinder head at least 1 or more sets. Make increase of compression power into the minimum by this one-way airstream way 21, and enable the rise of a compression ratio, and. As an energy preservation cycle, as isolation combustion in a diameter reduction main combustion chamber whose diameter was reduced by 1/5, for example, large-reduce a public nuisance and friction loss, and by two-step combustion of combustion at the time of approximation constant volume combustion and isolation release. While preservation savings save fuel, it acts as Noboru Oue (it is large increase about heat energy) of the highest firing pressure, and the maximum bearing load is moved to the first half side of a capital machine (drawing 1 B), a great portion of heat energy is changed into giant roll power, and Noboru Oue of thermal efficiency and large reduction of a public nuisance are aimed at.

[0014]In the body approximately center of the cylinder which carried out **** accommodation of both the head diameter expanded piston, and made right and left constitute a **** diameter expansion combustion chamber like drawing 3, drawing 4, and drawing 5. In order for a pendulum arm to carry out pendulum motion with reciprocating movement of both the head diameter expanded piston of ****, to rotate the crankshaft 25 supported pivotably in the lower end of

**** and to obtain power, The diameter expansion combustion chamber which penetrated the cylinder bores 22 and 22, established suitably in **** the flue outlet 23 exhausted from the diameter expansion combustion chamber of ****, and established suitably in **** the scavenging-air entrance 24 which scavenges the diameter expansion combustion chamber of **** for example, whose diameter was expanded by 5 times the diameter reduction main combustion chamber is made to constitute. That is, light-gage lightweight high power becomes possible from conventional technology at the large width to which the diameter expansion combustion chamber reduced the maximum bearing load near the dead center in 1 grade for 25 minutes by isolation combustion in a diameter reduction main combustion chamber since addition of the water injection system 19 was also possible to large diameter expansion, no heat insulation cooling, and large width low vibration and low temperature, and for low pressure. the pendulum arm which carries out pendulum motion with opposite reciprocating movement of both the head diameter expanded piston -- the upper and lower sides -- reciprocation -- easily the crankshafts 25 and 25 to the lower end of a pendulum arm, [support pivotably and] The middle of the pendulum arm among the piston side cams 7 and 7 supported enabling free rotation while moving the semicircle orbits 8 and 8 **** insertion ****, Moving the semicircle orbits 8 and 8, among the main part side cams 26 and 26 supported enabling free rotation, the pendulum arm of **** rocks to the right-and-left upper and lower sides with opposite reciprocating movement of **** insertion **** and both the head diameter expanded piston, the crankshafts 25 and 25 are rotated, and the upper bed of the pendulum arm also transmits power. The engagement synchronous means 1 and mechanical supercharger 2 which synchronizes opposite reciprocating movement of both the head diameter expanded piston, Earlier application is made to constitute suitably including the mechanical supercharger 31 and the synchronous means 32 of a statement, Adhere to the crankshafts 25 and 25 and the air outlet 27 is connected to the scavenging-air entrance 24 like drawing 7 thru/or drawing 10, The air inlet 28 is connected to the air inlet 28 via the exit of the usual turbosupercharger 29, and the turbosupercharger 29 scavenges a diameter expansion combustion chamber from the scavenging-air entrance 24 directly by a turbosupercharger, when connecting with the flue outlet 23, operating by exhaust air and not using the mechanical supercharger 2 like usual.

[0015]When an output is small, or when it constitutes as simply as possible, it may be made the 2nd example of drawing 2. Namely, in the overly large-sized isolation combustion in a diameter reduction main combustion chamber, in order to reduce vibration to a limit and to reach to an extreme of the limit of high power, and the limit of low vibration, synchronize an opposite piston, but. Since there is little heat energy changed into vibration near the dead center in order to limit near the dead center in an energy preservation cycle and to large-reduce the maximum bearing load etc. in 1 grade for 25 minutes as 1 grade for 25 minutes of conventional technology, vibration is also due to decrease, After approaching the first half side of a capital machine, in order to carry out isolation combustion release, the vibrational energy of conventional technology is changed into rotational motion power, and it is considered as giant roll power. Therefore, since vibration is large-reduced also as the 2nd example of drawing 2 and giant roll power is obtained, I expect that utilization is possible. Since both the head diameter expansion screw ton of the 1st example will be one piece, it is possible to provide the valve gear and inlet valve which are not in a figure, and to consider it as a four-cycle engine. Drawing 2 is what was made into the two-cycle uniflow-scavenging pendulum piston energy conserved cycle engine which reduced reduction (as a perfectly elastic collision and pendulum motion) of a reduction loss of kinetic energy, increase of a specific output, and the heat load of the cylinder, Therefore, the flue outlet 23 is replaced by the exhaust valve 30 and the scavenging-air entrance 24. Since the crankshaft 25 of drawing 5 becomes other points of difference one, and/or the engagement synchronous means 1 becomes unnecessary and makes it a two-step supercharge method with the turbosupercharger 29 as the arbitrary mechanical superchargers 2, it is preferred to consider it as the above-mentioned two-cycle engine which uses any one supercharger.

[0016]Drawing 5 thru/or drawing 10 quote drawing 5 thru/or drawing 10 of Japanese Patent Application No. 8-172752 (the 5th application of a claim of priority) as it is. For example, the engagement synchronous means 1 and mechanical supercharger 2 which synchronizes opposite

reciprocating movement of both the head diameter expanded piston of **** of drawing 3, Although gear like drawing 5, and the synchronous means 1 and mechanical supercharger 2 is made to constitute from what two gears are engaged and the crankshaft 25 of **** is rotated for (an engagement fan is included) and sent out from the air outlet 27 from the air inlet 28 like usual (refer to drawing 7 thru/or drawing 10). When not using the engagement synchronous means 1 and mechanical supercharger 2 as the mechanical supercharger 2, it is used as the engagement synchronous means 1, and when the engagement synchronous means 1 is unnecessary like drawing 2, it is used like usual, forming the flywheel which is not in a figure. Although a 1 cylinder (one combustion chamber) is connected with the crankshaft 25 in conventional technology, In order to connect 2 cylinder (2 diameter-expansion combustion chamber) in a pendulum piston crank chain, when considering it as a multi-cylinder engine, It is considered as many cylinders with 2 cylinder, a 4-cylinder, and 6-cylinder one at a 2 cylinder unit, and is made a 4-cylinder, 8 cylinder, and a twelve cylinder with a multi-cylinder engine by 4-cylinder unit by drawing 3 of two crankshafts at drawing 2 of one crankshaft. The check valve 20 of drawing 6 opens a diameter reduction main combustion chamber and a diameter expansion combustion chamber for free passage, are for making the one-way airstream way 21 which makes possible only the flow which goes to a diameter reduction main combustion chamber constitute, if the one-way airstream way 21 can be formed in a cylinder head, will not ask the composition of the check valve 20 including a reed valve, but. Since the heat load of the check valve 20 is reduced and the dead volume of a diameter reduction main combustion chamber can be expanded if insertion ****** is carried out from the diameter expansion combustion chamber side, it is desirable in order to make in use a super-lean-combustion two-cycle engine. Therefore, where press energizing of the valve element 37 is carried out to the valve seat 36 by the valve spring 38, insertion ****** of the check valve 20 of drawing 6 is carried out from the diameter expansion combustion chamber side, and the one-way airstream way 21 is made to form in the one-way airstream way 21. As for the slanting airstream way 39 which makes disorder form by the airstream injected from the one-way airstream way 21, and promotes combustion of injected fuel, it is preferred to provide in the **-proof [heat-resistant] material 9 of the neighborhood which is not closed by the diameter reduction piston or its part.

[0017]If isolation combustion in a diameter reduction main combustion chamber is used, although various energy preservation cycles are possible as an energy preservation cycle which does not almost have a possibility that unburned combustibles will remain, a piston cycle by two-step combustion of combustion at the time of approximation constant volume combustion and isolation release, Since it becomes NOx increase combustion even if the highest firing pressure acts as Noboru Oue by preservation savings in a large-sized combustion chamber, and residual gas is increased to a limit, even if it will use the limit of lean combustion, if approximation constant volume combustion is used, and it shortens isolation combustion periods to a limit, As an energy preservation cycle which added the water injection system 19 in the diameter reduction main combustion chamber, various kinds of moderate temperature isolation combustion is enabled. If various moderate temperature isolation combustion is explained with reference to drawing 7 thru/or drawing 10, in the device and method of making it into A type energy preservation cycle of drawing 7. Since there are few possibilities of discharging unburned combustibles like ****, it concentrates on reduction of NOx according to reduction (super lean combustion in a diameter reduction main combustion chamber) of fuel, and increase of residual gas, Aim at large reduction of a public nuisance and unburned combustibles are further made for there to be nothing by combustion at the time of diameter reduction main-combustion-chamber isolation release, It injects on the head of a diameter expanded piston as speed form dynamic pressure large heat energy + static pressure heat energy, and changes into giant roll power in a diameter expansion combustion chamber, high power is generated and it discharges from the flue outlet 23, and the turbosupercharger 29 is operated by the exhaust air, suction air is pressurized, and exhaust air is exhausted from an exhaust air part. The pressurized air may scavenge a diameter expansion combustion chamber from the air outlet 27 as it is, and also pressurizes it by mechanical supercharge mind via the air inlet 28, It shifts to the isolation combustion in a diameter reduction main combustion chamber which utilized the one-way airstream way 21 and

the diameter reduction piston, using super-high supercharge as selectable at the scavenging-air entrance 24 of a diameter expansion combustion chamber.

[0018]The device made into B type energy preservation cycle of drawing 8, Since it will shift to increase combustion of NOx if a combustion chamber becomes large-sized gradually, the water injection system 19 is added to A type energy preservation cycle, Even if energy conversion of the hot temperature of combustion is carried out to low-temperature superheated-steam mass capacity and the highest firing pressure goes up substantially by preservation savings, An energy conversion means (water injection system) is added to increase of lean combustion and residual gas, and generation of NOx is close brought that there is nothing by isolation combustion in the diameter main combustion chamber of moderate temperature high compression. Therefore, as shown in drawing 4, add the water injection system 19 suitably, and/or the fuel injection equipment 18 and the water injection system 19 are united suitably, Generation of NOx is close brought for the highest firing pressure as moderate temperature high voltage isolation combustion which can go up substantially that there is nothing by the addition of an energy conversion means to inject the high voltage high temperature hot water heated by the arbitrary exhaust air part heat exchange means 41 from the water injection system 19 of **** controlled by the control apparatus 40. The device made into C type energy preservation cycle of drawing 9, From the water injection system 19 of ****, add the diameter reduction part heat exchange means 42 to B type energy preservation cycle, inject a lot of high voltage high temperature hot water further heated by the elevated temperature by the control apparatus 40, and according to increase of the amount of energy conversion. Generation of NOx is close brought as moderate temperature high voltage isolation combustion which can go up substantially that there is nothing, and offer of heat insulation non-cooler Seki of the highest firing pressure is enabled for the theoretical air fuel ratio in a diameter reduction main combustion chamber, overfuel, and lean combustion. The device made into D type energy preservation cycle of drawing 10, Add the combustion part heat exchange means 43 to C type energy preservation cycle, and also large increase of the amount of energy conversion is enabled by enabling injection of a lot of high voltage high temperature hot water heated by the elevated temperature, It injects from the water injection system 19 of **** controlled by the control apparatus 40, and generation of NOx is made for there to be nothing for the highest firing pressure as moderate temperature high voltage isolation combustion which can go up substantially.

[Translation done.]

* NOTICES *

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is an outline graph for giving comparison explanation of the change of the chamber pressure to the degree of crank angle of the energy preservation cycle of this invention with conventional technology.
[Drawing 2]The partial sectional view of the 2nd example that reciprocating movement of both the head diameter expanded piston of this invention is made into an energy preservation cycle, and explains a perfectly elastic collision and pendulum motion.
[Drawing 3]The partial sectional view of the 1st example that vibration of this invention is reduced to a limit, and makes a pendulum piston an energy preservation cycle.
[Drawing 4]the diameter reduction main combustion chamber of this invention and the example of both the head diameter expanded piston are described -- a part -- a sectional view.
[Drawing 5]the engagement synchronous means and crankshaft of this invention are explained -- a part -- a sectional view.
[Drawing 6]The sectional view of the check valve concerning an embodiment of the invention.
[Drawing 7]The schematic diagram of the method of making this invention A type energy preservation cycle.
[Drawing 8]The schematic diagram of the method of making this invention B type energy preservation cycle.
[Drawing 9]The schematic diagram of the method of making this invention C type energy preservation cycle.
[Drawing 10]The schematic diagram of the method of making this invention D type energy preservation cycle.
[Description of Notations]

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CLAIMS

[Claim(s)]
[Claim 1]A diameter reduction piston whose diameter was reduced more suitably than a right-and-left approximately center of both head diameter expanded piston that moves reciprocately between the left dead center in a cylinder and the right dead center is projected, A diameter reduction main combustion chamber which provided a **** cylinder head in right and left of a cylinder, and accommodated said diameter reduction piston, respectively and whose diameter was reduced the optimal so that isolation combustion was possible is made to form, In a device made into an energy preservation cycle which both head diameter expanded piston moves [cycle] reciprocately by diameter reduction main-combustion-chamber isolation combustion of ****, and isolation release, carries out pendulum motion to a pendulum arm, rotates a crankshaft by the pendulum motion, and obtains rotational motion power, Provide the piston side cam which carries out insertion ****** of middle of a pendulum arm, and the end, respectively, and the main part side cam in **** opposite on a semicircle orbit, and **** insertion ****** of middle of a pendulum arm and the end is carried out at the inside [of both head diameter expanded piston], and main part side, A crankshaft (25) supported pivotably by lower end of a pendulum arm with reciprocating movement of both head diameter expanded piston enabling free rotation rotates, and transfer of power is enabled, A device which makes a one-way airstream way in which a check valve (20) which makes possible only a flow which opens a diameter reduction main combustion chamber and a diameter expansion combustion chamber for free passage, and goes to this diameter reduction main combustion chamber was provided an energy preservation cycle which more than a lot has at least in ****.

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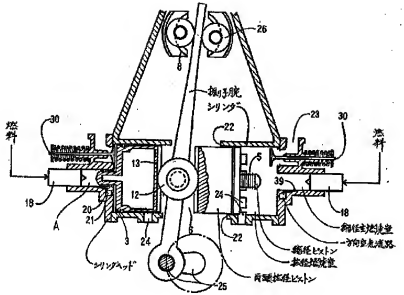
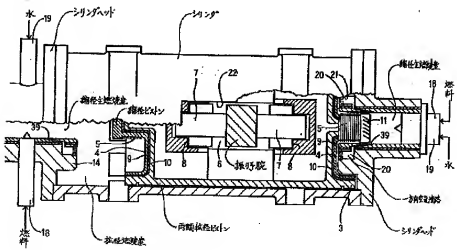
DRAWINGS

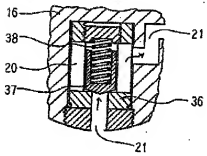
[The drawing 2]



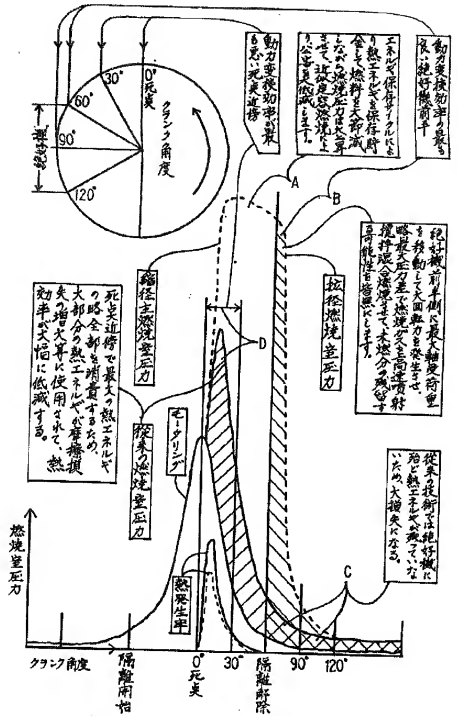
[Drawing 4]



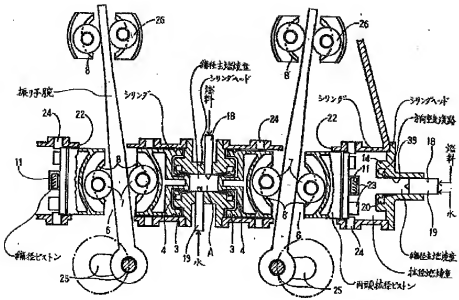
[Drawing 6]



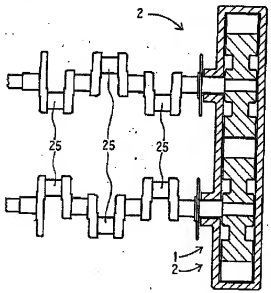
[Drawing 1]


0°
30°
60°
90°
120°
クランク角度
A
B
C
D
0°死点
隔離開始
隔離終了
クランク角度
燃焼室圧力
熱発生率
モータリング
膨張主燃焼室圧力
膨張後の燃焼室圧力
拡径燃焼室圧力

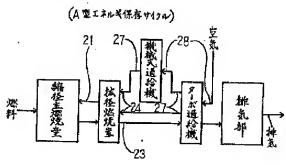
[Drawing 3]



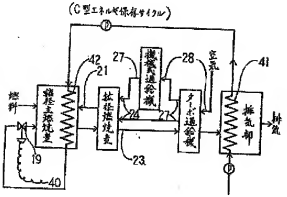
[Drawing 5]



[Drawing 7]

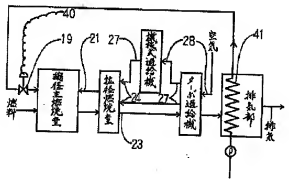


[Drawing 9]



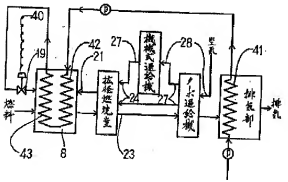
[Drawing 8]

(B型エネルギ保存サイクル)



[Drawing 10]

(D型エネルギ保存サイクル)



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